

# Sandia@60

Lab News **photographer Randy Montoya spends Sandia's 60th birthday chronicling the behind-the-scenes activities that make the Labs hum. See Randy's photos and personal essay beginning on page 5.**



60 years  
60 contributions  
Website showcases Sandia's impacts to the nation

By Julie Hall

Over the past 60 years, Sandia has made a mind-boggling array of significant contributions to the country in areas ranging from national security and space exploration to law enforcement and drilling technology. Sandia scientists and engineers have assisted in a number of high-



## 60 ways Sandia has impacted the nation

PREVIOUS NEXT RANDOM  
**25** Law enforcement.  
Diversionary devices called flash-bangs or stun grenades that are used by law enforcement and the military to temporarily distract or disorient an adversary can result in serious injuries because they function by creating a small explosion. Sandia has developed a safer, nonexplosive flash-bang technology and in 2008 licensed it to Defense Technology Corporation of America.

profile accident investigations such as the USS *Iowa*, TWA Flight 800, and the space shuttle *Columbia* disaster; provided critical analysis in the FBI's investigation of the anthrax letters mailed in 2001; and disabled a bomb found in the cabin of convicted Unabomber Ted Kaczynski.

On the somewhat lower profile side, Sandia researchers have made significant contributions to the safe destruction of chemical warfare agents, synthetic aperture radar, and the understanding of combustion, helping pave the way for more efficient, cleaner-burning engines.

And whether it's airports, airliners, drinking water, mines, or nuclear power plants, Sandians have contributed to making them safer.

To commemorate Sandia's 60th anniversary, the Media Relations & Communications group (3651) has put together 60 such notable contributions in a new website: "60 Ways Sandia Has Impacted the Nation." Each contribution's description is limited to two sentences so that readers, especially those with no technical background, can quickly grasp their significance.

You can either click through the contributions one by one or, by the end of the week, view all 60 on one page.

Look for "60 Ways Sandia Has Impacted the Nation" in the upper right corner of [www.sandia.gov](http://www.sandia.gov).

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KATHYE CHAVEZ (9324) inspects a component board in one of the many cabinets that make up Sandia's new Red Sky capacity supercomputer. (Photo by Randy Montoya)

## Red Sky at night, Sandia's new computing might

By Stephanie Holinka

There's a new supercomputer being born at Sandia, and it will stand on the shoulders of giants. But it will also be a more democratic supercomputer: of Sandia, by Sandia, and for all Sandians. Red Sky, now being assembled in the space where legendary system ASCI Red once stood, will replace Thunderbird, which currently serves as Sandia's "everyday" computer.

**Sandia's newest supercomputer will be its most accessible**

Red Sky will deliver more than 160 tera-flops peak performance and will provide roughly three times the computing capacity of Thunderbird. Red Sky is designed to be expanded economically to several times this initial capacity to meet future growth in demand. That's important because in-house requests for institutional computing cycles currently outpace supply by a factor of four.

"One thing that's really exciting to me about this project," says Rob Leland, director of Computing and

(Continued on page 4)

# Sandia LabNews

Vol. 61, No. 9

May 22, 2009

Managed by Lockheed Martin for the National Nuclear Security Administration



## Sandia: A past — and future — of exceptional service

By Bill Murphy

On May 13, 1949, President Harry S. Truman invited AT&T to "render an exceptional service in the national interest" by taking on management of Sandia. Sixty years and one day later, Sandia

### Tom Hunter shares insights about Sandia with Chamber of Commerce audience

shared his insights into the Labs' prospects for the years ahead.

Tom was the keynote speaker at a Chamber luncheon to observe and celebrate Sandia's long-term contributions to the community and to the nation. US Senators Jeff Bingaman and Tom Udall offered 60th-anniversary congratulatory messages to Sandia via video and representatives for US Reps. Martin Heinrich and Ben Ray Lujan also offered upbeat messages of support for the Labs and its mission.

"I want to talk to you today about who we are, what we do,

(Continued on page 4)

President and Labs Director Tom Hunter offered several hundred members of the Greater Albuquerque Chamber of Commerce a brief overview of Sandia's history and accomplishments and



TOM HUNTER addresses Chamber of Commerce audience. (Photo by Randy Montoya)



# Family Day 2009

Even though the winds were up, Sandians and their families came out for the first New Mexico open house in 10 years. See page 12.

# That's that

Since you're holding this newspaper, I probably don't have to tell you this, but I will anyhow: Make sure you check out the four-page center section. It's *Lab News* photographer Randy Montoya's very personal paean to Sandia on its 60th birthday. On May 13 – the 60th anniversary to the day of the famous Truman letter challenging AT&T to “render an exceptional service in the national interest” – Randy spent an almost around-the-clock cycle photographing activities across the Labs, some directly mission related and some that support the mission. All the photos, though, are about who we are and what we do. Sixty years from now, Sandians will still be looking at these photos and have real insights into the way we were in 2009.

\* \* \*

Hope it doesn't seem condescending, but in case you don't know the definition of the word I used above – paean – Merriam-Webster defines it as “a joyous song or hymn of praise . . .” Full disclosure: The word didn't exactly trip off the tip of my tongue; I found it in my thesaurus. Anyhow, if you take a look at those photos, I think you'll agree with my choice of word.

\* \* \*

Did you receive an email from me last week? Yes? Let me explain. Everyone in the Labs got an email from Al Romig about Sandia's performance in the Lockheed Martin Diversity Maturity Model. Well, when I read Al's message, I knew it was something we'd need to cover in the *Lab News*. So I wrote a note to my boss, Dept. 3651 manager Chris Miller, to work out some story assignment issues. Fine. Except I didn't hit the forward button in Outlook; I hit the Reply All button. Remember that line in *A Christmas Story* where Ralphie says “. . . except I didn't say fudge?” That was me. Doubleplusungood.

By the time I realized what I'd done and was able to recall the message, at least several hundred people had gotten the note. And I learned a couple of valuable lessons. Some Sandians are very nice and empathetic; some are funny. One recipient sent me a note, gently asking if I'd gotten a lot of ribbing. “Yeah,” I replied. “A lot, but I guess I deserve it. Hey, I'll do anything to bring this laboratory together, even if it's only to bond them in feeling superior to my stupidity.”

Then there were the notes like these: “Please don't use ‘reply all’ for responding to message, especially, broadcast messages like this.” Or: “You may not want to reply to all when ‘SLN [sic]-ALL-SITES’ is on the To line . . .” Oh. Who knew?

And one more thing. After this escapade, I went into my Outlook setup and got rid of the Reply All button. Just got rid of it. Now, to reply to all requires a conscious effort on my part, not just a reflex click. You might want to do the same thing. If nothing else, disabling the Reply All option on the toolbar ought to significantly reduce email traffic around here. And that's a good thing. A swipe at the complexity beast.

\* \* \*

Last week, we ran a poll for the Recruiting folks on our internal online *Lab News Interactive* site. The question: “What drives your career decisions?” The answers that drew the most votes hardly come as a surprise: Good pay, rewarding work, and good benefits. That's a winning combination. What about other factors, like a world-class workforce, service to the nation, or location? They really didn't figure very highly in career choice – at least among our poll takers. And the poll shows that you never know what's really going to catch any given individual's attention. In the comment section, one poll-taker said: “The cafeteria did it for me. The free parking was a close second.” To repeat myself: Who knew?

See you next time.

– Bill Murphy (505-845-0845, MS0165, wtmurph@sandia.gov)

## Sandia LabNews

Sandia National Laboratories  
<http://www.sandia.gov/LabNews>

Albuquerque, New Mexico 87185-0165  
Livermore, California 94550-0969  
Tonopah, Nevada • Nevada Test Site • Amarillo, Texas •  
Carlsbad, New Mexico • Washington, D.C.

*Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin company, for the US Department of Energy's National Nuclear Security Administration.*

Bill Murphy, Editor . . . . . 505/845-0845  
Chris Burroughs, Writer . . . . . 505/844-0948  
Randy Montoya, Photographer . . . . . 505/844-5605  
Mike Janes, California site contact . . . . . 925/294-2447  
Michael Lanigan, Production . . . . . 505/844-2297

Contributors: John German (844-5199), Neal Singer (845-7078),  
Stephanie Holinka (284-9227), Iris Aboytes (844-2282), Michael  
Padilla (284-5325), Julie Hall (284-7761), Patti Koning  
(925-294-4911), Michelle Fleming (Acs, Millepost photos, 844-4902),  
Dept. 3651 Manager: Chris Miller (844-0587)  
Lab News fax . . . . . 505/844-0645  
Classified ads . . . . . 505/844-4902

Published on alternate Fridays by Media Relations and  
Communications Dept. 3651, MS0165



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The *Sandia Lab News* is distributed in-house to all Sandia employees and on-site contractors and mailed to all Sandia retirees. It is also mailed to individuals in industry, government, academia, nonprofit organizations, media, and private life who request it.

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## Retiree deaths

*Note: For technical reasons — a change in processes at a sister organization — the Lab News has not had access to the list of retiree deaths since November, when we published the names of retirees who had passed away in October. Now that we have access to the information again, we are publishing the names of retirees who passed away between November and January. In our next issue, we will bring the information up to date.*

Geraldine M. Costello (age 92)	Nov. 12
Robert V. Scipes (82)	Nov. 12
John W. Pearce (90)	Nov. 13
Homer Leroy Crumley (79)	Nov. 14
B.S. Gardiner (80)	Nov. 16
Kenneth R. Dunbar (68)	Nov. 25
Ernest Lovato (80)	Nov. 27
Harold L. Anderson (87)	Nov. 28
Donald E. McGinnis (71)	Nov. 30
Ralph R. Davies (85)	Dec. 3
Frank J. Zanner (68)	Dec. 4
Celso L. Sanchez (83)	Dec. 19
Hunter W. Lewis (85)	Dec. 19
Elsie D. Wilkins (80)	Dec. 20
C.F. Schroeder (84)	Dec. 24
J. Norman Baker (79)	Dec. 25
Roy H. Lanes (82)	Dec. 26
Jacquelyn Lorita Foster (73)	Dec. 29
Ivan Neal Humble (85)	Dec. 29
Edgar E. Boeck (age 76)	Jan. 4
James C. Bushnell (74)	Jan. 4
Philip A. Nicovich (89)	Jan. 4
Wilda M. Ward (83)	Jan. 8
George E. Ingram (78)	Jan. 9
John Edward Hinde (77)	Jan. 10
Richard S. Cook (80)	Jan. 13
Henry K. Togami (91)	Jan. 15
Charles W. Gulick (82)	Jan. 16
Wendell W. Smith (83)	Jan. 16
William H. McAtee (74)	Jan. 17
Everett G. Hayes (92)	Jan. 19
Clyde Taylor (79)	Jan. 23
Mary Stella Zamora (67)	Jan. 23
Enos L. Greear (82)	Jan. 24
Fred T. Hansen (86)	Jan. 26
Matthew J. Connors (82)	Jan. 26
D.E. Schweitzer (84)	Jan. 28



## Recent Patents

*Note: Patents listed here include the names of active and retired Sandians only; former Sandians and non-Sandia inventors are not included. Following the listing for each patent is a patent number, which is searchable at the US Patent and Trademark Office website ([www.uspto.gov](http://www.uspto.gov)).*

\* \* \*

Eric Branson (1815), Seema Singh (8625), and Jeff Brinker (1002): Preparation of Hydrophobic Coatings. Patent No. 7,485,343

Tom Reichardt and Tom Kulp (both 8128): Method for Mapping a Natural Gas Leak. Patent No. 7,486,399

Tim Shepodd (8223) and George Buffleben (8625): Method for Absorbing Hydrogen Using an Oxidation-Resistant Organic Hydrogen Getter. Patent No. 7,485,277

Julia Hsu (1114): Directed Spatial Organization of Zinc Oxide Nanostructures. Patent No. 7,491,423

Tim Shepodd, Leroy Whinnery (both 8223), and Bill Even (8650): Castable Three-Dimensional Stationary Phase for Electric Field-Driven Applications. Patent No. 7,488,407

Kenneth Peterson (2452): Method of Using Sacrificial Materials for Fabricating Internal Cavities in Laminated Dielectric Structures. Patent No. 7,494,557

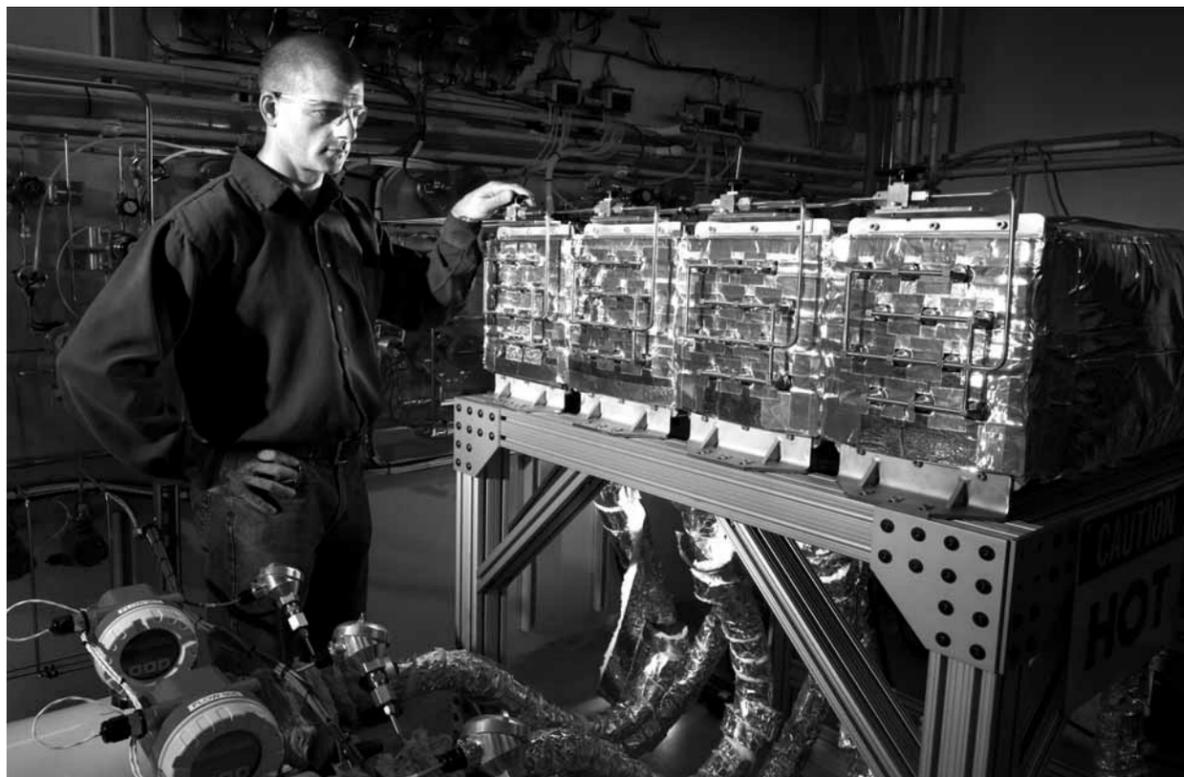
Ray Nyman (6316): Hydrogen Peroxide Modified Sodium Titanates with Improved Sorption Capabilities. Patent No. 7,494,640

Ed Hoffman (8964): Application for Managing Model-Based Material Properties for Simulation-Based Engineering. Patent No. 7,499,841

James Tomkins and William Camp (both ret.): Launching Applications on Compute and Service Processors Running Under Different Operating Systems in Scalable Network of Processor Boards with Routers. Patent No. 7,506,138

Tim Shepodd (8223) and Brent Haroldsen (8123): Reactors and Methods for Oxidizing Chemical or Biological Materials. Patent No. 7,495,145

# Sandia successfully completes hydrogen storage system for GM



TERRY JOHNSON surveys various components of the hydrogen storage system he and his team designed for General Motors. (Photo by Randy Wong)

By Mike Janes

Sandia researchers have designed and demonstrated key features of a hydrogen storage system that uses a complex metal hydride material known as sodium alanate. The system, developed through a multiyear project funded by General Motors, stores three kilograms of hydrogen, making it large enough to evaluate control strategies suitable for use in vehicle applications.

The design tools developed by Sandia researchers now provide GM with a workable template for future designs, which is expected to significantly save the company costs and time when developing hydrogen

storage systems for onboard vehicular applications.

"For GM, the enduring value of this project can be found in the design concepts, computational tools, and control strategies that Sandia developed," says Jim Spearot, GM lead executive for hydrogen storage. "With this new body of knowledge and information, we will be able to quickly design viable systems as new storage materials emerge."

## Methods have been validated

Sandia researchers are quick to point out that the system was not meant to fit on board a vehicle, and that sodium alanate will not be the material of choice

for onboard storage of hydrogen. But, although it is indeed larger and heavier than a viable automotive storage system requires, the system's engineered elements address many of the thermal management issues necessary for successful vehicular storage of hydrogen.

"We've shown that we can engineer vehicle-scale energy storage systems to meet a variety of operating requirements and driving cycles, and our design methods have been validated for relevant materials," says Terry Johnson (8365).

Terry says Sandia is well-equipped to do similar work on behalf of other companies, including those that manufacture rolling stock, specialty, or heavy-duty vehicles. Companies that focus on other niche applications, including underwater, military, or unmanned aerial vehicles, would likely benefit from Sandia's expertise, too, he says.

## Modular heat exchange system

In addition to its storage capacity, the unique features of the Sandia system include an advanced heating system whereby a fraction of the stored hydrogen is used to provide heat to release the remaining hydrogen. This method — the catalytic combustion of hydrogen — is not new, Terry says, but is unique to this particular application and the first to be successfully demonstrated. "We chose not to use resistive [electrically driven] heating, because it would have necessarily resulted in a larger and heavier system," he says.

After considering a number of thermal management options, Sandia selected a "shell-and-tube" heat exchanger, a heating technique common in many industrial processes. The "SmartBed" — a term coined by Sandia that refers to the method for controlling a modular storage system — consists of four identical modules, each of which contains a shell-and-tube heat exchanger. The material used to store the hydrogen — sodium alanate — resides within the tubes, which essentially serve as a high-pressure storage vessel. Inside the shell, a heating fluid circulates to transfer heat to and from the sodium alanate.

The modular design of the system means that only a minimum amount of the storage material needs to be heated at any one time. The design also aids in packaging the system to fit on board a vehicle.

Sandia's work with GM on a hydrogen storage system reflects the Labs' long history of exploring basic and applied science for energy and transportation. From developing renewable means of producing hydrogen, to discovering the science behind hydrogen safety, to creating the building blocks of hydrogen and fuel cell systems, Sandia scientists and engineers are actively working to help hydrogen and fuel cells take their place in a sustainable energy future.

# Sandia California News

## Walter Bauer's legacy lives on through scientific research

On April 4, 2009, Walter Bauer passed away in his home at the age of 74. He is survived by his wife Suzanne, son Greg and daughter Teresa, and four grandchildren.

Walter was an extraordinary person and scientist who left his mark on virtually every area of research at Sandia/California. He was born in Innsbruck, Austria, and lived through World War II before moving to the United States at the age of 14. His heritage gave him an enduring love of the outdoors that he relished through hiking, cycling, skiing, and sailing.

Tom Cook, a former Sandia executive VP and Sandia/California site VP, described Walter as the "real father of science at Sandia/California" at his Celebration of Life ceremony. Walter is also remembered as an avid cyclist and someone who stood up for his beliefs. "When I think of Walter, I think of his willingness to speak truth to power," says Glenn Kubiak (8620), senior manager of biological and microfluidic science.

"Walter was a superb scientist and made significant contributions in the area of plasma fusion devices and the problems associated with 'first wall' engineering," says Div. 1000 VP Rick Stulen. "We will remember him for his dedication to quality science, low tolerance for bureaucracy, and his passion for bicycling!"

Walter was an early proponent of hydrogen research, which led the California site to establish the Tritium Research Facility and receive responsibility for gas transfer systems. He was instrumental in pioneering the new field of plasma surface interactions to meet the R&D needs of magnetic fusion energy development and helped found the International Conference on Plasma Surface Interaction. Working with DOE and the fusion community, he was an author of the DOE Roadmap for Plasma Materials Interactions in 1978, which is still being followed today.



WALTER BAUER with his grandson Spencer at his "33 years of science" celebration in July 2002.

"Walter would never let us engineers forget the value that a strong scientific underpinning provided. He also made sure that we understood that it had to be nurtured and supported at the highest levels," says former Div. 8000 VP Mim John. "I give credit to Walter for being instrumental not only for his leadership in our more traditional physics and materials science efforts, but also in getting us well down the path early on in the biosciences. And only Walter would challenge the instructors from Berkeley, whom he brought in to teach us biology, with the first question 'What exactly is life?'"

Glenn adds that Walter had a direct hand in many areas for which Sandia/California is now well-known. "I can't think of an area he didn't touch — fusion, materials science, gas transfer systems, lithography, microfluidics, and biology," he says. "He also was a very effective mentor. He always gave direct feedback that made us better scientists, Sandians, and people."

In a letter to Suzanne, John Vitko (12101) described Walter's love for science, commitment to creating the best possible scientific capability at Sandia/California, and direct, but effective, way of "bulldozing" over all roadblocks and telling it as it is, as a combination he could only admire.

"Walter guided, mentored, encouraged, and befriended me throughout my career — from fighting the internal issues to getting me my first experimental capability, through allowing me to develop an atomic physics group under him, to managing and mentoring the California portion of the MicroChemLab team," he wrote.

"The amazing thing is that my story is not unique. It can and is being told by numerous other scientists whom Walter shaped, mentored, inspired, and befriended. His legacy lives on in each of us and in the scientific capability and commitment at Sandia that he established."

— Patti Koning

## Chamber talk

(Continued from page 1)

and what we stand for," Tom said.

Ticking off a decade by decade accounting of the Labs' evolution since its founding in the early days of the Cold War, Tom noted that as the nation's security concerns have changed, Sandia has adapted and broadened its own capabilities.

### Public debate essential

From its origins grounded almost exclusively in serving the nation's nuclear weapons enterprise, Sandia's work today is 40 percent weapons-related, with the remainder devoted to other urgent national concerns.

Today, Tom noted, fully 40 percent of the Labs' budget comes from non-DOE sources, including funds-in from other government agencies and from a broad range of industrial partners.

Tom said he welcomes the vigorous debate about national security priorities that always accompanies a change in administration in Washington. "Public debate in a democracy is essential," he said. "It drives us to the right decisions as a nation."

Emphasizing the word "national" in Sandia's formal name, Tom noted

that the Labs serves the entire nation and is involved in an advisory capacity in policy debates. And in providing that advice, he said, "We always try to do what is right for the country."

DOE is changing, Tom said, observing that the new administration will clearly place a high priority on energy research and will increasingly look to science and technology as a means to keep the nation competitive in a global marketplace.

### Most diversified national laboratory

As the most diversified national laboratory, Sandia is well-positioned to answer the nation's call to provide technological leadership, Tom said. Sandia, he said, can make a difference to the nation in the areas of reliable energy, a clean environment, a secure infrastructure, and in maintaining the strategic balance.

"I like to think of New Mexico as the place where

***"The nation will be a better and more prosperous place, and we'll be there to make our contribution."***

— Labs Director Tom Hunter



LABS DIRECTOR TOM HUNTER and Jim Altamirano, a VP with Commercial Data Systems Inc., visit a few minutes before Tom's keynote speech at a Greater Albuquerque Chamber of Commerce luncheon. Commercial Data Systems was a key sponsor of the event. (Photo by Randy Montoya)

science goes out to the world," he said.

As it faces the future, Sandia must be mindful to ensure it maintains a world-class workforce, world-class capabilities, and a diversity of partners, while continuing to hold workplace safety at the center of its culture.

While Sandia is a national laboratory, Tom said, its impact in the local community has been substantial. Labs employees, he said, have proven themselves over the decades to be committed and caring people: Sandians contributed more than \$3.8 million to United Way in 2008, making Sandia far and away the agency's biggest supporter. Additionally, Sandians donated thousands of hours as volunteers in schools and community-based organizations.

Its economic impact, too, has been significant, with a New Mexico payroll that exceeds \$700 million. (New Mexico retirees also receive about \$160 million per year). That money is spent largely in the local economy. An additional \$300 million is spent on procurement in the region.

Ultimately, Tom said, Sandia defines itself by its values: service to the nation; respect for each other; teaming for great results; acting with integrity; and delivering with excellence.

Concluding on a positive and optimistic note, Tom predicted that in the years ahead, "The nation will be a better and more prosperous place, and we'll be there to make our contribution."

## Red Sky

(Continued from page 1)

Network Services Center 9300, "is that we're taking the architectural philosophy and design principles that we pioneered in systems for the weapons program such as ASCI Red and Red Storm and building a machine that will be broadly available to the entire Laboratory."

Rob says Red Sky is intended to be a capacity machine (intended to support a large number of small and medium-sized jobs) but to be much more scalable, (allowing larger, more complex jobs to be run) than typical commercially provided capacity systems. The trick, Rob says, is to leverage the economics of commodity parts and yet incorporate the design principles learned from previous generations of specialized high-performance computing systems.

The use of "red" in the name is meant to evoke the successful supercomputing systems and programs of Sandia's past. The designers and builders of Red Sky built on the design principles and successes of earlier machines such as ASCI Red from the mid-1990s and Red Storm from early 2000.

"We use 'red' in the name to convey that we intend to deliver a very high-caliber system to the user community at Sandia," Rob says. "It's also intended to convey to the broader computing community that this is a machine consistent in its approach and its philosophy with those previous machines that were so highly regarded. We're trying to create that continuity and that sense of legacy."

Red Sky will be more than just a capacity machine. "It's a scalable design," Rob says, "which means that application codes can run very efficiently using lots of

processors on the system. But it's also an extensible machine, meaning we can physically build it out. We can add more computing power to it in an efficient way that doesn't require us to rework the machine."

Rob says that in a more typical machine designers have to add a whole bunch of infrastructure to it in a nonlinear way to improve performance.

"Normally," Rob says, "if you doubled the size of the machine, for example, you'd need four times as much cabling. That's not true here because the machine is very replicable and very extensible."

One key feature that enables physically extending the machine is the simple "topology" used, Rob says, meaning that things are connected in a three-dimensional mesh-type grid.

"It turns out," Rob says "that structure is a good choice for mapping physical codes onto the machine because physics is typically expressed mathematically in a three-dimensional grid that matches well to the machine."

A project of this complexity and ambition requires a close partnership with leading-edge vendors. In this case, Sandia worked with Sun Microsystems and Intel.

"Sun was willing to take substantial risks and create and invest in technology for the partnership," Rob says, "so it was a very good fit for our needs and goals." Sun was also willing to work with Sandia to innovate in several key dimensions, he says.

"Intel gave us early access to their latest processing technology and very competitive pricing for that new technology," Rob says. Intel was a natural choice because it has been very actively reestablishing itself in the scientific high-performance computing market in recent years. Rob says Intel's processor technology is moving intentionally toward incorporating certain key technologies and design features that support Sandia's

goals for the machine.

The Red Sky project, Rob notes, required both a commitment to strong technical innovation and strong value because the machine must provide the highest-quality service for the lowest prices possible. The Labs also wanted the project to continue Sandia's legacy of innovation and excellence in high-performance computing and leadership in the field.

Red Sky is expected to be online in full production service later this year.

### Greening Red Sky

Red Sky will live in a greener home. Computing Systems and Facilities made its new air conditioning units 30 percent more power-efficient.

John Zepper, senior manager of Computing Systems, says the Red Sky project allowed them to partner with Facilities to explore more efficient ways to cool the new supercomputer, whose processors generate tremendous heat.

"Normally," John says, "when you go into an old computer room it's cold because the entire room is cooled to prevent the computer's processors from overheating." With Red Sky, John notes, the systems deliver the cooling directly to the processors.

In the new method, Glacier doors will pump refrigerant through a pipe system in the computer cabinet doors, so the doors chill the computer more directly. As Red Sky's processors heat up the refrigerant, the refrigerant becomes a gas and then recycles through the cooling process. The new system improves cooling efficiency from 70 percent to about 95 percent efficiency.

The power usage effectiveness (PUE) of the Red Sky system is an almost unheard-of 1.035.

PUE (according to a Wikipedia entry) is the ratio of power delivered to IT equipment to the total amount of power used by the data center facility.



7:55 p.m. The sun sets on Sandia's 60th anniversary of the presidential mandate to render an "exceptional service in the national interest." Clint Hobart (6472) evaluates the F6A explosive ordnance disposal robot at the Robotic Vehicle Range. Sandia has been working on robotic research since 1958.



6:03 a.m. Early-bird Sandians beat the sunrise to work as they stream through the Wyoming gate.

# A day in the life

a photo essay by Randy Montoya

## Sandia@60

60 years on, president's words resonate with life

When President Truman in 1949 chose the words "exceptional service in the national interest," to describe his intent for Sandia, I'm not sure he could have known the challenge he set forth for the employees of that day and for those who came in the 60 years that followed.

I have had the privilege of being the *Lab News* photographer for nearly 40 percent of Sandia's life. On May 13, the anniversary date of the Truman letter, I spent 22 hours photographing a single day of your work. I wanted to see if those words still echoed our halls after all that time.

It's easy to become skeptical, if not jaded, when faced with the tremendous challenges we have seen. However, on every step leading up to this project — and especially on that day — I found the same thing I've witnessed since I first arrived in 1986. I found a laboratory full of people trying to help, proud and eager to talk about their work, and concerned about my well being.

I wanted to show a variety of what we do with a few important inclusions of the work that got us here.

This is an incomplete work. I did all I was able to do and only a fraction of what I wanted to. It was a fantastic, busy day and seemed somehow more impressive, like gathering individual flowers into a bouquet. It's easy to see, when you take time to really look, how many people around us are always trying in some way or another to live up to President Truman's words. I think Harry would certainly be proud of our technical achievements, but I bet he would also be proud of how dedicated the support staff of Sandia is to enabling those accomplishments.

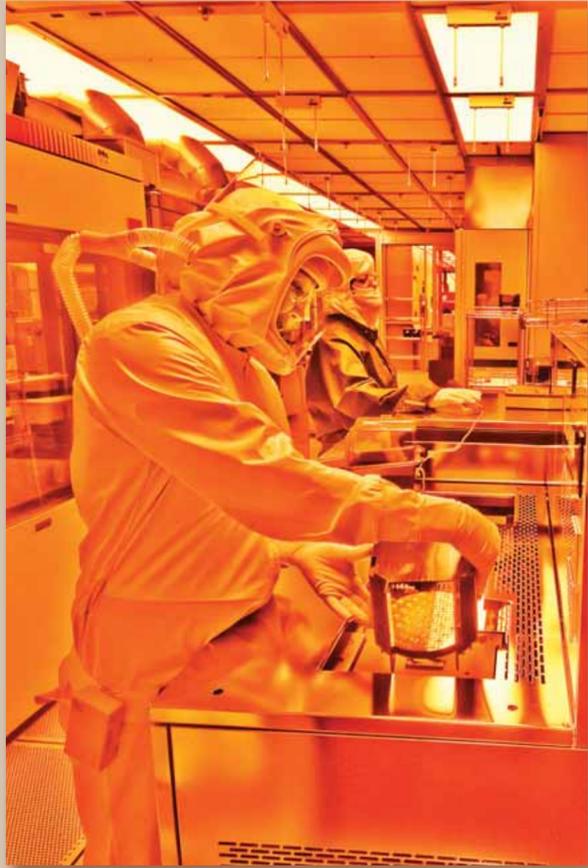
You can show up at 1 a.m. and find people repairing, protecting, maintaining, and preparing our way for the next day. It is that spirit of "WE" that I think propels Sandia's successes. This must be the easiest place I can think of for finding people trying to do things better today than they did yesterday.

And yes as corny as it sounds, the words still echo here. They no longer belong to President Truman but to us.

— Randy Montoya



12:01 a.m. The Emergency Operations Center is staffed as it always is day and night 365 days a year. Lisa Louchard, left, and Rebecca Brown (both 4136) monitor alarms and security throughout all tech areas while most Labs personnel sleep at home.



11:11 a.m. Beth Connors (2916, left) and a Weapon Intern training class examine a B61-11 weapon casing. The Weapon Intern Program since 1998 has exposed next-generation weaponeers to the wide range of issues related to the development and maintenance of the nation's strategic deterrent.

6:47 a.m. The night shift of the 858EL MicroFab work around the clock on solid-state lighting initiatives.



2:05 a.m. Ann Perez (9317) of the computer annex conducts the hourly walkthrough of the Thunderbird computer. All Sandia computer systems are monitored at all hours of the day and night to make sure they are safe and secure.



9:17 a.m. Saturn Accelerator diver Tom Meluso (1342) sets up a test prior to firing the 75 trillion watts of X-rays.



3:44 p.m. Doris Willis (4848) of Custodial Services gets Bldg. 800 ready for visitors to the national laboratory.



2:36 p.m. The Annular Core Research Reactor is readied for another test by Dave Clovis (1381). The test facility can fire several shots per day. Sandia has been operating reactors since 1958.



12:36 a.m. Facilities' swing shift maintains the air exchangers of Bldg. 858EF to enable the high tech work of the clean rooms for the next day. This six-member crew, along with all of the Facilities staff, keeps Sandia operational night and day.

3:05 a.m. Security police officer Rick De Leon (4211) stands middle-of-the-night security watch. There is no sleep for the vigilant.



2:44 a.m. Willis Whitfield's statue stands watch over Sandia's MESA complex accompanied by the nighttime sky.



10:01 p.m. *Lab News* photographer Randy Montoya (3651) shoots one last photo.

# Sandia, Purdue investigate new methods for monitoring and operating wind turbines

By Chris Burroughs

Sensors placed on Sandia research turbines in Bushland, Texas, are providing researchers from the Labs and Purdue University enhanced capabilities to monitor and control wind turbines.

A team from both institutions presented research on the topic in a paper at the Windpower 2009 Conference and Exhibition in Chicago in early May.

"Excessive loads on wind turbines can cause damage to components, which can then lead to costly repairs or even catastrophic failure in some circumstances," says Josh Paquette (6333), one of the Sandia engineers who worked on the project. "We are investigating how an accelerometer system can help determine blade motions and structural health, and allow for operational modifications to avoid damage."

The accelerometer systems consist of sensors and software that constantly monitor forces exerted on wind turbine blades. They measure two types of acceleration: those due to varying winds and those caused by gravity and rotation. It is essential to accurately measure and separate both sources of acceleration to estimate forces exerted on the blades.

Purdue is under contract with Sandia to help develop the technology. In this particular research relationship, the two institutions are collaborating on an experiment using these sensors to monitor turbines in real time. The goal is to determine how the blades were actually

being loaded and then eventually feed that information into a turbine's control system.

The sensor research, says Jose Zayas, manager of Wind Energy Technology Dept. 6333, has been conducted on subscale experimental-size blades. The results will then be extrapolated to full-size machines.

"This work is important because as more wind power is deployed, it is essential to continue to develop innovations that improve the technology and protect the

capital investments," Jose says. "Each utility-scale machine costs in the range of \$2 million to \$4 million and damaged components could lead to the loss of entire machines."

Wind power is becoming a more prevalent part of the US energy portfolio, Jose notes. At the end of 2008 some 25 gigawatts of wind energy had been installed nationwide. Also, in 2008 — for the second year in a row — wind energy accounted for approximately 40 percent of all new energy installed in the US.

A wind turbine's major components include rotor blades, a gearbox, and generator. The wind turbine blades are made primarily of fiberglass and balsa wood or foam, and occasionally are strengthened with carbon fiber.

"The aim is to operate the generator and the turbine in the most efficient way, but this is difficult because wind speeds fluctuate," says Doug Adams, a professor of mechanical engineering and director of Purdue's Center for Systems Integrity. "You want to be able to control the generator or the pitch of the blades to optimize energy capture by reducing forces on the components in the wind turbine during low winds. In addition to improving efficiency, this should help improve reliability."

Jose calls the joint research between Sandia and Purdue "a perfect partnership between a national laboratory and an academic institution."

"It shows how the two can work together and collaborate to improve industry," he says.



JON WHITE, a PhD candidate at Purdue University, conducts a field test on one of the Sandia experimental wind turbines in Bushland, Texas. (Photo by Mark Rumsey, 6333)

## Dates to know for Work Planning and Control (WP&C)

By Jennifer Jennings Carr (4130)



Important milestones are approaching for the Work Planning and Control (WP&C) activity-level improvement process.

The milestones play an important role in ensuring deployment of WP&C across the Labs. WP&C processes are aimed at improving

work productivity, efficiency, environmental compliance, and — most important — worker safety.

Having appropriate, simple, and effective WP&C processes, and using these processes is vital in preventing incidents, says Bob Brandhuber, senior manager in ES&H Safety, Environmental Programs, and Emergency Management Dept. 4130.

The improved WP&C process, says Bob, provides the procedures and tools necessary for Sandia managers and key personnel to achieve their responsibilities for ensuring a safe work environment while delivering the product.

Three critical milestone dates:

- June 30 — WP&C procedures
- Sept. 30 — Readiness certification
- Dec. 18 — Implementation verification

**June 30 — WP&C procedures:** All organizations conducting activity-level work are required by June 30 to ensure the availability of a comprehensive WP&C procedure that incorporates the corporate process. As a

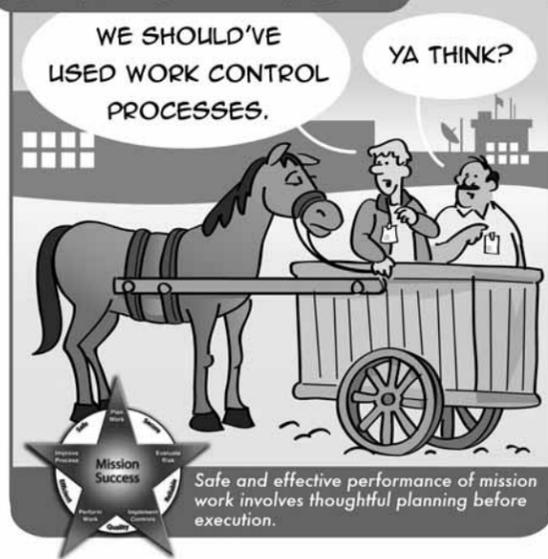
reminder, Implementation Assistance Team (IAT) personnel will review current organizational work activities and WP&C documentation, perform a gap analysis against the revised WP&C guidance, and help to effectively integrate and implement the revised WP&C process and documentation. Contact your Division ES&H coordinators or Jeff Downs (505-844-6821 or jsdowns@sandia.gov) to schedule IAT assistance.

**Sept. 30 — Readiness certification:** Readiness certification must be completed Labs-wide by Sept. 30. Readiness certification entails a letter from each senior manager responsible for activity-level work certifying the existence and implementation of an approved comprehensive organizational WP&C procedure. A certification letter template will be distributed to applicable senior managers following review and approval of the comprehensive organizational WP&C procedure(s) through the Integrated Safety Management department. The receipt of a certification letter by the Integrated Safety Management department is the appropriate verification of completing this milestone.

**Dec. 18 — Implementation verification:** The effectiveness of the revised activity-level WP&C procedure and its implementation must be verified by Dec. 18. The verification will begin upon receipt of Readiness Certification and will continue through the completion of this milestone. The Integrated Safety Management department will conduct the assessment activity applying the following criteria:

- Assessments will be conducted by personnel inde-

### SANDIA SAFETY SQUAD



pendent of the organization being reviewed.

- Assessments will be conducted using preestablished criteria and review approach documents.
- Assessments will engage a statistically relevant sample.
- Corrective actions identified during the assessments will be tracked to completion.

For information about ongoing efforts in WP&C, contact Bob Brandhuber (rbrandh@sandia.gov or 505-845-1237) or Brad Elkin (bselkin@sandia.gov or 505-844-0418).

## Town hall meetings start June 16

Starting June 16, Sandia's Small Business Utilization Dept. 10222 will begin a series of five town hall meetings to engage the local supplier community in dialogue and information-sharing sessions regarding how to do business with Sandia, to review current contracting opportunities, and to discuss specific topics requested by the supplier community.

The first town hall will be held June 16, 1-3:30 p.m., at the New Mexico Veterans' Memorial at the northeast corner of Gibson and Louisiana boulevards. It is targeted to veteran-owned small businesses (VOSB) and service disabled veteran-owned small businesses (SDVOB).

The second town hall in the series, for women-owned small businesses, will be held June 23.

Sandia veterans are encouraged to come and meet with local VOSBs and SDVOBs to find local, veteran-owned suppliers of goods or services. For more information, contact Toni Leon Kovarik (10222) at 284-9549.

Sandia's Small Business Utilization Dept. 10222 recently presented a sponsorship check to the Veterans' Procurement Assistance Center and its director, Archie Garcia. On hand for the presentation were Don Devoti, manager of Small Business Utilization Dept. 10222; Supply Chain Center 10200 Director Carol Yarnall; Senior Manager for Supply Chain Integration, Dept. 10220 Billie Weatherly; and Toni Leon Kovarik (10222).

Sandia vets will be receiving materials shortly that outline the simple process of looking up potential veteran-owned small business suppliers.



SANDIA KICKS OFF its "Sandia Counts on Vets" campaign by sponsoring the Veterans' Procurement Assistance Center (VPAC). In the photo, Archie Garcia, center, of VPAC accepts a check from Sandians Don Devoti of Small Business Utilization Dept. 10222, Carol Yarnall, director of Supply Chain Management Center 10200, Billie Weatherly, Supply Chain Integration Dept. 10220, and Toni Leon Kovarik (10222).

# Mileposts

New Mexico photos by Michelle Fleming  
California photos by Randy Wong



Thomas Snowden  
40 5926



Mary Ann Sweeney  
35 1670



Jeffrey Braithwaite  
30 1826



Steven Buck  
30 8133



Tim Dubay  
30 2611



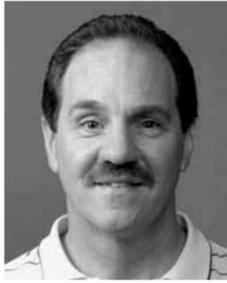
Ken Nunez  
30 424



John Smith  
30 8123



Donald Ukena  
30 5932



Edward Binasiewicz  
25 5761



Robert Dankiewicz  
25 8945



John Garcia  
25 8512



Gordon Groves  
25 2626



Mark Jaska  
25 8353



Joseph Kotulski  
25 1653



Joseph Maestas  
25 9336



Margaret Murray  
25 5342



Mark Nissen  
25 1534



Steve Ratheal  
25 6453

## Director Dave Carlson receives 2009 University of Illinois NPRE Distinguished Alumni Award for career accomplishments

By Iris Aboytes

Dave Carlson, former chief operating officer of the Nuclear Weapons Strategic Business Unit received the University of Illinois Nuclear, Plasma, and Radiological Engineering (NPRE) Distinguished Alumni Award April 30 during the NPRE 2009 honors banquet at Urbana-Champaign.

Dave was recognized for his career achievements during his more than 30 years at Sandia.

Dave's interests have always been far-ranging.

"Even today, I find everything interesting," says Dave. "Astrophysics was always my passion and I had a particular interest in nucleosynthesis [the nuclear reactions and creation of elements in stars] and stellar evolution."

To pursue his passion, Dave attended Indiana University and was one of 12 graduates in the highly specialized astrophysics program.

Dave continued his graduate studies in astrophysics at the University of Illinois. "I found out that the job market was abysmal," he says. "The market was so bad that they didn't replace those who died." So he turned to another passion of his youth — nuclear technology. That led to a graduate degree from NPRE and his employment at Sandia.

"I came to Sandia because there were lots of opportunities, challenging work, and bright people," says Dave. "Sandia is an outstanding place to work."

He spent the first 13 years at Sandia in the nuclear energy program and was one of the authors of NUREG/CR 2300, a fundamental reference in the probabilistic risk assessment field.

Dave was a principal investigator for the US Senate investigation of the accident at Three Mile Island. Working closely with Sen. Pete Domenici, he led a team investigating the causes of the accident and the Senate's inquiry into improving the Nuclear Regulatory Com-

mission's emergency response capabilities.

Dave went on to manage Sandia's role in the cooperative DOE/Electric Power Research Institute/nuclear power industry program for extending the licensed lifetimes of nuclear power plants.

Dave has spent the last 20 years at Sandia on nuclear weapons safety and security. In 2000 he became director of the Surety Assessment Center, leading a group of 150 specialists in nuclear weapon safety, security, reliability, quality, and surveillance.

Dave's most recent position was as chief operating officer of the Nuclear Weapons SBU, supporting Executive VP Joan Woodard (004), leading the team of directors in deploying and managing the nuclear weapons program and the staff of 100.

"Sandia has been an outstanding place to work," says Dave. "It has become a much more complex place these days. The demands on management and staff create a much more stressful environment."

"My work with Linda Duffy (3300) helped me realize that as a manager it was important to model health-

ier behavior," says Dave. "For me, that meant finding time for exercise, family, and relaxation. This is a challenge in today's environment, but very important to creating a healthful and creative workplace. I hope each of us, as leaders, can set a healthful example for our employees."

Dave looks back with satisfaction at his career. "I can truly say that I loved my work," he says. "I enjoyed coming to work every day, and I feel that I was able to contribute to many important issues facing our nation."

"Receiving the University of Illinois Nuclear, Plasma, and Radiological Engineering (NPRE) Distinguished Alumni Award brought me back full circle to where I started," says Dave. "I was very humbled to receive the award for work I loved doing."



A DISTINGUISHED MAN — Dave Carlson, right, receives Distinguished Alumni award during the University of Illinois' Nuclear, Plasma, and Radiological Engineering honors banquet. With Dave is NPRE department head James Stubbins. (Photo courtesy of University of Illinois)

## Sandia signs MOU with Japanese national institute

Sandia and Japan's National Institute of Advanced Industrial Science and Technology have signed an agreement to conduct and share research of mutual interest. Areas of immediate importance named in the memorandum of understanding include photovoltaics, nanoelectronics, nanomaterials, and computational investigations of the properties of materials.



SANDIA PRESIDENT AND LABS DIRECTOR Tom Hunter, center, and Div. 1000 VP Rick Stulen, left, greet Toshihiro Nikai, who heads Japan's Ministry of Economy, Trade, and Industry. Nikai and a delegation visited the Sandia/Los Alamos CINT facility, which may figure prominently in a just-signed MOU between Sandia and Japan's National Institute of Advanced Industrial Science and Technology.

Collaborations are expected to include staff exchanges between the two labs and information-sharing through jointly held workshops.

Sandia Div. 1000 VP Rick Stulen and Tamotsu Nomakuchi, president of AIST signed the agreement on May 4 in DOE's Washington, D.C., headquarters. Present were Japan's Minister of Economy, Trade, and Industry Toshihiro Nikai and DOE Secretary Steven Chu.

A tour at Sandia the previous Saturday was led by Bob Hwang (1130) and Los Alamos National Laboratory's Andy Shreve, director and codirector, respectively, of the Sandia/LANL Center for Integrated Nanotechnologies.

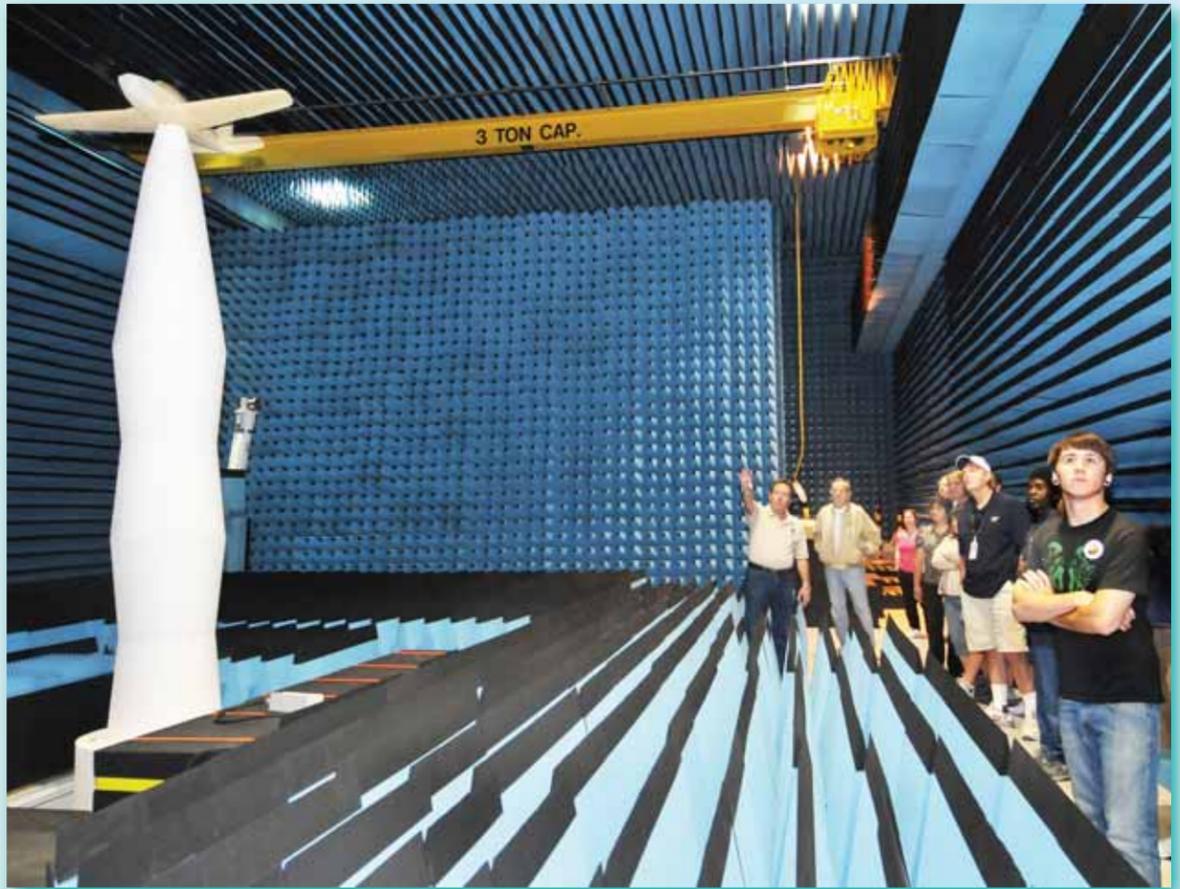
The tour included Rick and Sandia president Tom Hunter, along with Nomakuchi and Nikai.

— Neal Singer

# Family Day 2009

More than 12,500 Sandians and their families and friends came out to enjoy Family Day on Saturday, May 16. Tom Hunter and many VPs were there to volunteer and mingle with the crowds. Sandians showed off their offices and enjoyed the activities and demonstrations provided by each division. Also popular were the children's activities, which were moved to the Schiff Auditorium because of high winds. Although those winds might have kept some folks away — attendance predictions always were in the 12,000-16,000 range based on *Lab News Interactive* survey research — the weather *did* provide an opportunity to see how agile the team charged with Family Day logistics and choreography could be. Tents went up on Hardin Field the afternoon and evening before Family Day — locations for registration, activities, picnicking, etc. But as volunteer workers began arriving on the day of the event they were met with tents that had blown down and forecasts for increasing winds. So, activities were moved quickly from Hardin Field to other locations, and strategically placed electronic signs informed arriving open house attendees that one of the registration stations had been moved. In addition to the challenging weather, there were several snake sightings, no injuries reported, and only one security-related incident. And even folks who didn't attend Family Day 2009 got a flavor of it. Reporters from three Albuquerque TV stations and one radio station covered the event.

Photos by Randy Montoya



KURT SORENSEN, manager of SAR Sensor Technologies Dept. 5345, conducts a tour of the Radar Cross-Section facility.



MARK TUCKER (6327) demonstrates Sandia-developed decontamination foam to fascinated visitors.



SOLAR POWER — Visitors ponder a melted steel plate on display at the solar tower.



BRAD PEYTON (1342) explains the function of the Saturn accelerator.



JAKE DEUEL, manager of Mobile Robotics Dept. 6472, explains the workings of a robotic vehicle to his family.